

1. (Currently amended) ~~In a~~ A cross-laminate comprising ~~mutually bonded films of~~ which at least one pair of two adjacent mutually bonded separately coextruded films A and B ~~each of which are each coextruded with~~ has an uniaxial or unbalanced biaxial orientation with the main direction of orientation in film A crossing the main direction of orientation in film B and ~~each film contains~~ said films each comprises a continuous main layer consisting of a polymer material ~~having~~ selected to give high tensile strength, ~~said main layers each having~~ on at least their] mutually facing sides of said main layers ~~at least~~ a first surface layer of a different polymer material, and interposed between each first surface layer and its main layer a second surface layer, the improvement wherein said first surface layer on the main layer of each of the films A and B [is] being a discontinuous layer consisting of at least one [an] array of coextruded thin strands [,] with the strands in the adjacent arrays of the two films ~~being~~ arranged in crossing relation to one another, [and] the polymer material of ~~said strands is~~ at least one such array being selected to modify a property in the surface of the respective film which relates to the optical appearance of the laminate, or the bonding between the mutually facing sides of the main layers of the films A and B, or a combination thereof and said second surface layer is continuous and formed of a polymer material selected to control the bonding between the strand-free facing regions of the main layers.

2. (Currently amended) A cross-laminate according to claim 1 wherein the strands in the respective arrays are in contact with one another at their points of intersection and are of a polymer material such as to be [are] strongly bonded to each other at said points of intersection ~~with a bond that is greater than~~ and the polymer material of said second continuous surface layer is selected so that the bond between the ~~remainder~~ strand-free regions of the mutually facing sides of said films A and B is at most weak.

3. (Currently amended) A cross-laminate according to claim 1[,], wherein the polymer material of the strands of at least one of said arrays has added thereto pigmentation to thereby modify the optical appearance of the laminate.

4. (Currently amended) A cross-laminate according to claim 1 wherein the thickness of the strands in the first surface layer of each of said films A and B is not greater than 30% of the thickness of the respective film.

5. (Currently amended) A cross-laminate according to claim 1 wherein the collective ~~width~~ area of the strands in each of said first surface layers constitutes not more than 60% of the area of the respective film side.

6. (Currently amended) A cross-laminate according to claim 1 wherein the thickness increase in each of said films A and B at the locations where the strands are present is at most 30% of the film thickness in adjacent strand-free regions thereof.

7. (Previously presented) A cross-laminate according to claim 1 wherein the distance from the center-to-center of adjacent pairs of strands in each array is between 2 mm and 80 mm.

8. (Cancel)

9. (Cancel)

10. (Currently amended) A cross-laminate according to claim 2, wherein the bonding strength at said points of intersection of the thin strands of said arrays, as measured by a peel test carried out on narrow specimens of the cross-laminate at a velocity of about 1 mm cm⁻¹, is at least 40 g cm⁻¹ and the bonding strength in the strand-free ~~remainder of said mutually contacting surfaces~~ regions, determined by a similar test, is at the highest 75% of

the bonding strength between the strands at said points of intersection.

11. (Cancel)

12. (Currently amended) A cross-laminate according to claim [11] 1 comprising an assembly of wherein said two pairs of said films share comprise a common film A having an array of said strands a main layer with a strand-formed first surface layer on both of its surfaces and two exterior films B each having a strand-formed first surface layer facing toward said common film B with the strands thereof bonded to the strands of said common film A.

13. (Currently amended) A cross-laminate according to claim 1 which comprises on at least one of its outer films, an exterior surface layer adapted to enhance a surface property of the laminate selected from its heat-sealing capability or its frictional properties.

14. (Previously presented) A cross-laminate according to claim 1 wherein the main layer of each of said two films A and B consists essentially of polyethylene or polypropylene.

15. (Currently amended) A cross-laminate according to claim [8,] 2 wherein in each of said films A and B the main layer is selected from HPDE, LLDPE or a blend of the two, the continuous second [bonding] surface layer is formed mainly of LLDPE in admixture with 5 - 25% of a copolymer of ethylene having a melting point or a melting range within the temperature range of 50 - 80 °C, and the strands in the first surface layers of said films is selected from a polymer which consists essentially of a copolymer of ethylene having a melting point or a melting range within the temperature range of 50 - 100 °C or a blend of such copolymer and LLDPE containing at least 25% of the said copolymer.

16. (Canceled)

17. (Canceled)

18. (Currently amended) A cross-laminate according to claim 1[6] which when viewed in cross-section taken ~~through the striations~~ transversely of said thin strands exhibits a generally regular arrangement of ribs formed by corrugations imparted to the cross-laminate which are thicker than its average thickness and have a generally arcuate curvature in one direction perpendicular to its surface with the regions thereof adjacent to the rib boundaries being in the tensionless state bent in the opposite direction so that the regions between the boundaries of two adjacent ribs are ~~generally flat~~ of substantially reduced curvature compared to that of said ribs.

19. (Currently amended) A cross-laminate according to claim [1] 2 wherein ~~the strands of said arrays bond strongly at their points of intersection and each of the films A and B has a second surface layer interposed between the strand-formed first surface layer and the main layer thereof and each said second~~ surface layer includes an adhesion modifying material to establish an at most weak bonding or a blocking between the contacting mutually facing sides strand-free regions thereof ~~in the strand-free regions.~~

20. (Currently amended) A cross-laminate according to claim 1 in which the first surface layer on at least one of said films A and B comprises at least two ~~sets of said arrays~~ of strands, at least one of each said sets two arrays being formed of a polymer material differing in appearance from ~~every~~ another of said two arrays and the strands of ~~every other set~~ the differing arrays being interspersed with one another.

21. (Previously presented) A cross-laminate according to claim 1 wherein said first surface layer on each of the films A and B occupies at the highest 15% of the volume of the corresponding film.

22. (Previously presented) A cross-laminate according to claim 1 wherein the average melting point of the polymer material which constitutes the strand-formed first layer of each

of said films A and B is at least about 10 ° C lower than the average melting point of the polymer material which constitutes the main layer.

23. (Currently amended) [In a] A method of manufacturing a cross-laminate comprising mutually-bonded polymer films [of] which comprises separately forming each of at least two adjacent films A and B ~~each are formed by coextruding in a flat or circular die a main layer of a polymer material having selected to give high tensile strength, [and] a discontinuous first surface layer of a different polymer material and interposed between said main layer and its first surface layer a continuous second surface layer, and in which said films A and B are brought together in sandwich relation in said coextrusion die and each has imparted thereto imparting to each of said films A and B a uniaxial or unbalanced biaxial molecular orientation at any stage after being brought , bringing said films A and B together in [said] sandwich relation with said main directions of orientation in crossing relation and with said first surface layers contacting one another, and after being brought together, then subjecting said films A and B are subjected to heat to at least partially establish bonding there between to form a laminate, the improvement comprising the steps of coextruding each of the said first surface layers being coextruded discontinuously in a direction generally transverse to [its] the main direction of orientation of the corresponding film to thereby form the surface layer as an array of strands extending lengthwise generally in said main direction of orientation in crossing relation to the strands of said other film, [and] selecting the polymer material of the strands to modify a surface property of the respective film which relates to either the optical appearance of the laminate or the bonding between said films A and B or a combination thereof and selecting the polymer material of said continuous second layer to control the bonding between the strand-free regions of said main layers.~~

24. (Currently amended) A method according to claim 23 wherein during said heating, the heat is applied generally evenly all over films A and B and the selection of polymer

materials for the ~~main~~ second and first surface layers is such that the heating creates strong bonds at the points of intersection of the strands of the two films but make at most a weak bonding between the strand-free contacting surfaces ~~thereof the main layers of said films~~ .

25. (Canceled)

26. (Currently amended) A method according to claim 23 wherein ~~said die is circular to form the cross-laminate as a tube~~ at least one of said films A and B is coextruded in a circular coextrusion die in tubular form with a circumference at the exit of said die of at least 20 cm, and the first surface layer thereof is coextruded discontinuously so that the distance from center-to-center of adjacent strands in the tubular film at the exit from said die is at the highest 8 cm ~~and the circumference of the tube at said exit is at least 20 cm.~~

27. (Currently amended) A method according to claim 23 wherein after said films are brought together in said sandwich arrangement and before, after or simultaneously with being subjected to said heat to establish said at least partial bonding there between, the films are further oriented by stretching in their longitudinal or transverse directions or both.

28. (Cancel)

29. (Canceled)

30. (Canceled)

31. (Currently amended) The method according to claim 23 which further comprises coextruding film A as a three-layer assembly having a ~~film-B~~ main layer with at least a first surface layer coextruded on both of [the] its opposite sides [~~of a common film A, said film A having said first surface layer on each of its opposite sides and said films B having said first surface layer on at least the side thereof contacting a side of said film A,~~ and bringing said

three-layer film A together with a film B on each of its opposite side so arranged that the arrays of strands of the first surface layer of each said film B intersecting are in crossing relation with the array of strands of the surface layer of said film A proximate thereto.

32. (Canceled)

33. (Canceled)

34. (Previously presented) A method according to claim 62 wherein the embossing step is carried out by passing said films A and B after they have been brought together in sandwich relation and before or after they have been subjected to said heating through at least one pair of mutually intermeshing grooved rollers to form said corrugations and simultaneously effect a transverse stretching of the same.

35. (Currently amended) A method according to claim 23 including the step of controlling during the coextrusions of said films A and B the relative rates of flow of the polymeric materials of said main and first surface layers thereof ~~each of said films A and B~~ so that said first surface layer on each of the films A and B makes up at the highest 15% of the volume of the respective film A or B. [1]

36. (Previously presented) A method according to claim 23 wherein the average melting point of the polymer material of said strand-formed first surface layer of each of said films A and B is at least about 10° C lower than the average melting point of the polymer material of the main layer thereof.

37. (Currently amended) A circular extrusion die comprising a distribution section for forming at least a first molten polymer material into a generally even circular flow, and bodily separate from said distribution section an exit section comprising ~~a circular~~ an annular main channel with generally cylindrical or conical walls for receiving said generally circular flow of

said first polymer material and conducting the same to an annular exit orifice to exit there from as a tubular film structure, said exit section also comprising a channel system spaced radially from said main channel for ~~circumferential~~ extrusion from the circumference of said exit section of a circular array of narrow strands of a second molten polymer material, said channel system ending in a circular row of internal orifices opening into ~~the~~ a circular wall portion of the main channel upstream of said exit orifice so that said circular array of said second polymer material merges with the circular flow of said first polymer material as circumferentially spaced ~~lines~~ strands superimposed on said circular flow.

38. A circular extrusion die according to claim 37 wherein said channel system for said circumferential extrusion begins at at least one inlet in said exit section and comprises for delivering said second polymer material to each said internal orifice a labyrinthine sub-channel system ~~connected~~ communicating at one end ~~to~~ with such inlet and at the other ~~to~~ end with one of said circular array of the respective internal orifice [s], said sub-channel system comprising at least three channel-branchings between said ends to promote a balanced division of polymer flow to said internal orifices.

39. (Canceled)

40. (Canceled)

41. (Canceled)

42 - 52. (Canceled)

53. (Currently amended) A cross-laminate according to claim 1[,], wherein the thickness of the strands in the surface layer of each of said films A and B is not greater than 10% of the thickness of the respective film.

54. (Currently amended) A cross-laminate according to claim 1 [,] wherein the collective ~~width~~ area of the strands in each of said surface layers constitutes not more than 30% of the area of the respective film side.

55. (Previously presented) A cross-laminate according to claim 1 wherein the thickness increase of each of said films A and B at the locations where the strands are present is at most 10% of the film thickness in strand-free regions.

56. (Previously presented) A cross-laminate according to claim 1 wherein the distance from the center-to-center of adjacent pairs of strands in each array is between 2 mm and 20 mm.

57. (Previously presented) A cross-laminate according to claim 2 wherein the bonding strength in the strand-free remainder of said mutually contacting surfaces, determined in the same manner, is not more than 50% of the bonding strength between the strands at said points of intersection.

58. (Currently amended) A cross-laminate according to claim 1 having a general thickness at the highest of about 0.3 mm, and wherein a film A is situated at one of its surfaces, said film A having its exterior surface corrugated to form a visible pattern of striations extending in one direction with the spacing of said striations in said pattern being at the highest about 3 mm, the polymer materials of the thin strands of said arrays on said film A are coloured, and the main layer and said second surface layer of said film A [is] are substantially transparent to enable the coloured strands to be visible when the laminate is observed from the A-side, the depth of the corrugations being sufficient that the strands appear at least about 0.5 distant from the striations to impart a three-dimensional effect to the cross laminate.

59. (Currently amended) A cross-laminate according to claim 1 wherein said first surface layer on each of the films A and B ~~occupies~~ makes up at the highest 5% of the volume of the corresponding film.

60. (Currently amended) A cross-laminate according to claim 1 wherein the average melting point of the polymer material which constitutes the strand-formed first surface layer of each of said films A and B is at least about 20° C lower than the average melting point of the polymer material which constitutes the main layer thereof.

61. (Currently amended) A cross-laminate according to claim [26] 1 wherein the distance from center-to-center of adjacent strands of each said first surface layer is not greater than 2 cm.

62. (Currently amended) A method according to claim 23 wherein the films ~~A and B are coextruded of the final cross-laminate are brought together~~ with a film A on an exterior side ~~of the final laminate~~, the polymer material for the first surface layer of at least said film A being coloured and the polymer material for the main layer and second surface layer thereof being sufficiently transparent to render the strands of the first surface layer visible therethrough, and coextrusion conditions for the respective films are controlled so that the general thickness of the final laminate is not more than about 0.3 mm, which comprises the further step of embossing at least the exterior surface of said film A into corrugations forming a pattern of striations extending in one direction with corresponding thickness variations in said film, the ~~divisions~~ the separation between the striations in said pattern being not more than about 3 mm and the corrugations having a depth sufficient that the strands appear to be spaced at least about 0.5 mm ~~distant~~ internally from the striations to impart a three-dimensional effect to the final laminate.

63. (Previously presented) A method according to claim 35 wherein said first surface

layer on each of the films A and B makes up at the highest 5% of the volume of the respective film A and B.

64. (Previously presented) A method according to claim 36 wherein the average melting point of the polymer material of said stand-formed first layer of each of said films A and B is at least about 20° C lower than the average melting point of the polymer material of the main layer thereof.

65. (New) A cross-laminate according to claim 19 wherein said adhesion modifying material consists essentially of low molecular weight polyisobutylene or atactic polypropylene.

66. (New) A cross-laminate comprising mutually bonded polymer films of which at least two contiguous films A and B are each separately coextruded and have a uniaxial or unbalanced biaxial orientation with a main direction of orientation and are arranged in said laminate so that their main directions of orientation are in crossing relation, each of films A and B having a main layer consisting essentially of a polymer material selected for high tensile strength and on the side of each such main layer facing a contiguous film at least first surface layer which is discontinuous and consists of an array of coextruded thin strands, the strands of film A being in criss-crossing relation to the strands of film B, said first surface layer on at least one of said films A and B consisting of a material selected to modify the optical appearance of the laminate.

67. (New) A cross-laminate according to claim 66 wherein the material of said first surface layer selected to modify the optical appearance of said laminate contains a colored pigment.

68. (New) A cross-laminate according to claim 66 having a general thickness not greater than about 0.3 mm, and wherein one of said films A or B constitutes an exterior

surface thereof, said exterior surface exhibits a visible pattern of striations extending in one direction and formed by superficial corrugations in said film resulting in corresponding thickness variations therein, the separation between adjacent striations in said pattern being not greater than 3 mm, and said strands of said exterior film are of a material having a visible coloration, said exterior film otherwise being sufficiently transparent to show the colored strands when the laminate is viewed from said exterior side, said corrugations being of sufficient depth that the strands appear to be spaced internally of said corrugations a distance of at least about 0.5 mm.

69. (New) A cross-laminate according to claim 67 wherein the material of said colored strands comprises a pigment imparting a metallic luster or an iridescent effect thereto.

70. (New) A cross-laminate according to claim 67 which when viewed in cross-section taken transversely of said striations exhibits a generally regular arrangement of ribs which are thicker than its average thickness and have a generally arcuate curvature in one direction perpendicular to its surface with the regions thereof adjacent to the rib boundaries being in the tensionless state bent in the opposite direction so that the regions between the boundaries of two adjacent ribs are of substantially reduced curvature compared to the curvature of said ribs.

71. (New) A method according to claim 26 wherein said first surface layer of said tubular film is coextruded discontinuously so that the distance from center-to-center of adjacent strands thereof film is at most 2 cm.

72. (New) A method according to claim 23 wherein said at least one first surface layer polymer material is selected to modify the optical appearance of said laminate and including the step of extruding between said films A and B and intermediate layer of a polymer material selected to effect bonding between the films as they are brought together and subjected to

said heating.

73. (New) A method according to claim 23 which further comprises separate coextruding a film C having a main layer with at least one surface layer on at least one of its sides and bonding a said film C to at least one of the exterior sides of said films A and B with its surface layer facing said exterior side before, during or after their bringing together to bond the said films A, B and C into a mutually bonded assembly, the surface layer polymer material of said film C being selected in association with the conditions of its bonding to produce a stronger bond between its surface layer and the contacting surface of said film A or B than the bond between said films A and B in the strand-free regions thereof.

74. (New) A circular extrusion die according to claim 38 which further comprises a small circumferential channel in said wall portion of said circular main channel upstream of the exit thereof, said internal orifices opening in common into said small channel.

75. (New) An extrusion die according to claim 37 which further comprises an additional circular channel for extruding a circular flow of a third molten polymer material on the side of said generally circular flow of said first polymer material facing said circular array of narrow strands of said second material upstream of the point where the circular array merges with first circular flow to thereby form on the first circular flow of said first polymer material a continuous layer of said third polymer material underlying said circular array of narrow strands upon its merger with the first circular flow.